

teachers, he says: "Botany has, perhaps, been more influenced than zoology, as is evidenced by the fact that laboratory work is much more general than formerly, and, further, that courses in cryptogamic and physiological botany are now given in colleges where attention was formerly limited to flowering plants." Just how an institution, in which biology is a *nom de guerre* for zoology, has been so efficient in improving the instruction in botany, is not apparent, and the few institutions in which botany, not to specify cryptogamic and physiological botany, is taught, have *not* been supplied from Johns Hopkins.

CURRENT LITERATURE.

A monograph of the Fontinalaceæ.¹

We are glad to note the publication of this work, in which M. Jules Cardot endeavors to clear up the perplexing forms of our water mosses. The contribution is all the more welcome because the group is one which has its home in our own country, for of the forty-three species of the family, no less than thirty occur in North America, of which twenty-one are endemic.

M. Cardot recognizes six genera, arranged in two tribes. The Fontinalaceæ include *Hydropogon*, *Cryptangium*, *Fontinalis* and *Wardia*; the Dichelymeæ include *Brachelyma* and *Dichelyma*. The genus *Fontinalis* of course contains the bulk of the species. The other three of the first tribe are monotypic, *Hydropogon* and *Cryptangium* coming from tropical America, while *Wardia* belongs at the Cape of Good Hope. *Brachelyma* is revived to receive our *Dichelyma subulatum*, while *Dichelyma* consists of four species.

A notable feature of the monograph is the mode of indicating the rank of the species. They are designated as of four orders. Those of the first order have the greatest assemblage of characters by which they can be discriminated, those of the second order have a smaller assemblage of such characters, and so on. *Fontinalis Neo-Mexicana*, for example, is a species of the third order, being much more poorly marked than *F. antipyretica* of the first order. This does away with subspecies and is much more satisfactory. Varieties are recognized as subordinate forms under species of any rank.

The full citation of synonymy, exsiccati, and geographical distribution, and the extended descriptions and remarks all combine to form

¹ CARDOT, JULES.—Monographie des Fontinalacées. Extrait des Mémoires de la Société nationale des Sciences nat. et math. de Cherbourg, tome xxviii. 1892. 8vo, pp. 152. Separates 6 fr. 50.

a most excellent piece of work, which is made thoroughly available by a good index. A few separates only have been printed which can be procured of the author at Stenay, France. (See also this journal, *ante*, p. 31.)

Botanical micro-technique.

The constant advance which is now making in the investigation of plant structures demands frequent revisions of the books dealing with the methods of such investigations, and gives opportunity for the making of new ones. Strasburger very successfully combined a laboratory manual with an exposition of technique, a plan which has its disadvantages. Dr. Zimmermann, privat-docent in the University of Tübingen, has produced a book dealing wholly with technique¹, in which he has brought together the most approved and modern methods of preparing, imbedding, cutting, staining and mounting histological material.

The first section gives an account of the general methods of research; the second describes the organic and inorganic compounds occurring in plants and the reactions by which they can be detected; while the third gives an account of the special methods applicable to the investigation of cell walls in their various modifications and to the protoplasmic cell contents and inclusions. There is some overlapping in these sections naturally, but probably as little as could be expected between any divisions of the subject. A very short appendix mentions some special methods applicable to the examination of bacteria. The study of these organisms has become so much of a specialty and has such an amount of technique that the author wisely leaves this field to others.

The work before us is more complete than those of Poulsen and of Behrens, its two predecessors. If it is inadequate anywhere it is in the paragraphs on the methods of imbedding and section cutting. The arrangement and full index render it exceedingly easy of reference, which in so far enhances its practical value.

Spite of the fact that it would too soon be out of date, it would be well to have it translated into English. It could certainly be made far superior to the cumbersome and costly American edition of Behrens' Guide, and it is much more exhaustive than Trelease's Poulsen, which is almost the only book in English now available.

¹ZIMMERMANN, A.—Die botanische Mikrotechnik; ein Handbuch der mikroskopischen Präparations-, Reaktions- und Tinktionsmethoden. 8vo. pp. x, 278. figs. 63. Tübingen: H. Laupp'schen Buchhandlung. 1892. M. 6.

Minor Notices.

BULLETIN 38 of the Cornell Experiment Station¹ is devoted to an account of the cultivated native plums and cherries, by Prof. L. H. Bailey. The thorough treatment of the subject and the admirable illustrations keep this bulletin fully up to the rank of its predecessors. Ninety-five varieties are referred to their botanical sources, while forty-four remain still uncertain to the author, being known only from literature or the descriptions of correspondents. From this paper it appears that we have the following native species in cultivation: *Prunus Americana* Marsh., with 45 varieties; *P. hortulana* Bailey and its var. *Mineri*, with 27; *P. angustifolia* Marsh. (*P. Chicasa* Mx.), with 18; and *P. maritima* Wang. with 1. The value of *P. subcordata*, the wild plum of the Pacific coast is yet to be determined. The cherries are treated in a similar manner, but more briefly, since few of the natives have been extensively cultivated. There is an attempt to unravel the tangle regarding *Prunus pumila* of Linnæus and its eastern and western forms, which Prof. Bailey thinks distinct.

TEACHERS in both country and city schools (and in many colleges too) will find the "Elementary Botanical Exercises" recently issued by Dr. Charles E. Bessey² most suggestive and helpful. It will help those who would like to see their pupils at some more fruitful work than the memorizing of descriptive terms and the "practice of a few diagnoses." The keys to the lower plants near the end will be specially useful to those who find themselves helpless as far as ordinary text-books are concerned when any but flowering plants are studied. The key-note of the booklet is struck in these sentences from the first pages:

"Botany is *not a book*; much more is it *not a little book*." "Botany is the study of plants, not the study of books. It is making the personal acquaintance of the structure, reproduction, habits, uses and relationships of plants; not a study about plants. When the inquisitive boy digs up his mother's flower seeds in order to see how they grow, that is botany in the scientific sense; but when he memorizes a chapter on 'germination' in a text-book, that is not botany at all."

PROF. MOSES CRAIG, the botanist of the Oregon Experiment Station, has prepared a bulletin on "Some Oregon weeds and how to destroy them." There are brief descriptions of about thirty weeds, accompanied by wretched illustrations, with directions for destroying each that any body of sense would know. Beyond compliance with the absurd law which requires stations to issue a certain number of bulletins each year, we fail to see the value of such publication.

¹ pp. 73. 8vo. June 1892.

² Published by J. H. Miller, Lincoln, Neb., 1892, 12mo. pp. 50. 35 cents.

IN THE report of the Michigan Horticultural Society for 1891, Mr. A. A. Crozier gathers a host of opinions relating to the mutual influence of the stock and graft. The literature quoted bears on the various phases of the subject, such as change in habit, earliness, character of the fruit, disease, variegation, hardiness, etc. While the testimony is often conflicting and some of it doubtless untrustworthy, Mr. Crozier has done well in collecting what has been written on the matter, as the first step towards his experimental study, which we trust will shed more light on this interesting topic.

DR. ROLAND THAXTER publishes in the *Proceedings* of the American Academy of Arts and Sciences a paper which "includes the additions which have been made during the season of 1891 to the previously recorded species of North American Laboulbeniaceæ, a small number only of new forms being reserved for later description for lack of sufficient material. Three new genera are represented,—*Ceratomyces* by two species, *Corethromyces* and *Acanthomyces* each by a single species. The genus *Heimatomyces*, formerly including a single European form, contributes ten species, nine of them new; while, lastly, the genus *Laboulbenia* adds sixteen species, thirteen of which are undescribed. In all thirty species, by which the sum total of American forms is increased to forty-nine. . . . The contribution of aquatic forms is of especial interest, the genus *Ceratomyces* forming a distinct departure from previously described generic types." The descriptions are full, but without figures.

AS A BULLETIN of the Agricultural Experiment Station of Tennessee, Prof. F. Lamson-Scribner has issued the first part of a manual of the grasses of Tennessee.¹ "This first part is designed for the farmers and agricultural students of the state; affording the former a handy reference book for general information as to the general character and quality of our grasses, and giving the latter a concise account of the characters of the grass family, together with a key for determining the tribes and genera into which the species are classified." There is included in this part an alphabetical list of the native and introduced or cultivated grasses of the state; a series of illustrations, with descriptions thereof, for affording explanation of the technical terms; characters of the grass family, with a key to genera; and, lastly, a list of the books and pamphlets on this group accessible at the station. "In part two it is proposed to fully describe, and, so far as possible, illustrate all of the grasses of the state. Part one is introductory to this."

¹ LAMSON-SCRIBNER, F.—The grasses of Tennessee. Bulletin of Agric. Exp. Station of the Univ. of Tenn., vol. v., no. 2. 8vo. pp. 30-113. Apr., 1892. Vol. XVII.—No. 8.

THE GEOGRAPHICAL distribution of the liverworts of northern Norway is comparatively little known. To aid in the elucidation of this subject, Dr. H. Wilh. Arnell undertook extensive journeys through that region in the summer of 1891. He has brought together the results of his studies and examination of literature in a quarto pamphlet, under the title "Lebermoosstudien im nordlichen Norwegen," giving an account of the vertical and superficial distribution of 115 species. It may be obtained of the author at Jönköping.

PROF. J. G. LEMMON, of Oakland, California, has published a "hand-book of West-American cone-bearers." It contains brief popular descriptions, and also attempts to establish approved English names. In the great confusion of names in local use the attempt deserves success, and no one is better fitted to speak of Pacific forests than Professor Lemmon.

PROFESSOR L. H. BAILEY has published an excellent paper on cross-breeding and hybridizing.¹ The philosophy of the crossing of plants is considered with reference to their improvement under cultivation, and a brief bibliography of the subject is given. The paper was originally given as a lecture before the Massachusetts State Board of Agriculture.

DR. C. HART MERRIAM has published a list of the plants of the Pribilof or Seal Islands² (Bering Sea), based upon specimens collected from July 28 to August 10, 1891. The collection contains about 1000 specimens, representing over 130 species. This is far the largest collection that has been made, or reported from these islands. There is not a tree or bush on the islands, the highest woody plant being the dwarf *Salix reticulata*. Some critical notes are furnished by Mr. J. N. Rose, and various groups have been referred to well-known specialists.

NOTES AND NEWS.

MR. THEO. HOLM has resigned his position in the National Museum and accepted a place in the Division of Vegetable Pathology.

THE SUMMER course for the study of shrubs and trees at the Arnold Arboretum proved highly successful. About thirty persons were in attendance.

PROFESSOR DR. ALEXANDER BATALIN has been appointed Director of the Imperial Botanic Gardens at St. Petersburg in succession to the late Dr. E. Regel.

¹ The Rural Library, vol. 1, no. 6, April, 1892.

² Proc. Biol. Soc. of Washington, VIII, 133-150, July, 1892.